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Under 37 C.F.R. §1.116 -- June 17, 2002]

REMARKS

Reconsideration of this application is respectfully requested.

Claims 1266-1575 were previously pending in this application. Those claims have been canceled in favor of newly-added claims 1576-1242. Accordingly, claims 1576-1242 are presented for further examination on the merits.

New Claims

In a further sincere effort to place their application in allowable condition, Applicants have added new claims 1576-2142 above. The new claims are described in detail below.

Applicants' claimed array practice is set forth in claims 1576-1761. Claim 1576 is independent and defines that each surface comprises at least one double-stranded nucleic acid fixed or immobilized thereto, and that at least one nucleic acid strand or a sequence therefrom comprises one or more non-radioactive chemical labels which comprise a non-radioactive signaling moiety or moieties which are quantifiable or detectable. Claim 1576 further recites that at least one nucleic acid strand or a sequence therefrom in one of said surfaces is different from at least one other nucleic acid strand or a sequence therefrom in another surface, and that the non-porous substrate comprises siliceous matter or polymeric material. Claims 1577-1669 depend from claim 1576 and are directed to various other embodiments, such as the non-porous siliceous substrate (claims 1577-1581); the non-porous polymeric substrate (claims 1582-1588); surface treatment agent and surface treatment (claims 1589-1600); attachment of nucleic acid strand or sequence (claims 1601-1604); nature of nucleic acids (claims 1605-1607 and 1611-1613); source of nucleic acids (claims 1608-1610); labels and signaling

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moieties (claims 1614-1660); signal quantification or detection (claims 1661-1664); transparent or translucent properties (claims 1665-1666); collection or set (claim 1667); and system (claims 1668-1669).

Array claim 1670 is also independent and is directed to an array comprising a non-porous substrate having surfaces. Claim 1670 recites that each surface comprises at least one nucleic acid strand fixed or immobilized thereto, and further, that at least one nucleic acid strand or a sequence therefrom in one of said surfaces is different from at least one other nucleic acid strand or a sequence therefrom in another surface, and that the non-porous substrate comprises siliceous matter or polymeric material. Claims 1668-1761 depend from claim 1670 and are directed to various other embodiments, such as the non-porous siliceous substrate (claims 1671-1675); the non-porous polymeric substrate (claims 1676-1682); surface treatment agent and surface treatment (claims 1683-1694); attachment of nucleic acid strand or sequence (claims 1695-1696); nature of nucleic acids (claims 1697-1701 and 1705); source of nucleic acids (claims 1702-1704); labels and signaling moieties (claims 1706-1752); signal quantification or detection (claims 1753-1756); transparent or translucent properties (claims 1757-1758); collection or set (claim 1759); and system (claims 1760-1761).

In other claims (1762-2142), Applicants are pursuing subject matter for a non-porous system. Four of these claims are independent (1762, 1859, 1953 and 2049). In claim 1762, Applicants are claiming a non-porous system which comprises a non-porous solid support comprising comprising an activated surface and at least one double-stranded nucleic acid strand or a sequence fixed or immobilized to said solid support surface covalently or non-covalently through said activated surface. Claim 1762 further recites "wherein said at least one double-stranded nucleic acid strand or sequence comprises one or more non-radioactive

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chemical labels which comprise a non-radioactive signaling moiety or moieties which are quantifiable or detectable." Claims 1763-1858 depend from claim 1762 and directed to the nature of the non-porous support (1763-1775); surface treatment (claims 1776-1787); fixation or immobilization (claims 1788-1792 and 1858); nature of the nucleic acid (claims 1793-1800); labels and signalling moieties (claims 1801-1847); detection (claims 1848-1851); and additional characteristics of the non-porous solid support, activated surface or system (claims 1852-1857)

Claim 1859 is directed to a non-porous system which comprises a non-porous solid support having an activated surface; and at least one single-stranded nucleic acid strand or sequence fixed or immobilized to said solid support surface covalently or non-covalently through said activated surface. Claims 1860-1952 depend from claim 1859. Like their counterparts in claims 1763-1858, dependent claims 1860-1952 are directed to embodiments such as the nature of the non-porous solid support (claims 1860-1872); surface treatment (claims 1873-1884); fixation or immobilization (claims 1885-1886 and 1952); nature of the nucleic acids (claims 1887-1894); labels and signalling moieties (claims 1895-1941); detection (claims 1942-1945); and additional characteristics of the non-porous solid support, activated surface or system (claims 1946-1951).

In new claims 1953-2048, Applicants are pursuing subject matter in which the surface of a non-porous solid support comprises one or more amine or polyamine or amino-derivitized or amino-substituted groups, to which groups is fixed or immobilized at least one double-stranded nucleic acid strand or sequence. As set forth in claim 1953, which is independent, a non-porous system is defined. The system comprises a non-porous solid support comprising a surface which comprises one or more amine or polyamine or amino-derivitized or amino-substituted groups thereon, and at least one double-stranded nucleic acid strand or

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sequence fixed or immobilized to the solid support surface covalently or non-covalently through the amine or polyamine or amino-derivitized or amino-substituted group or groups. The claims further recites "wherein said at least one nucleic acid strand or sequence comprises one or more non-radioactive chemical labels which comprise a non-radioactive signaling moiety or moieties which are quantifiable or detectable." Claims 1954-2048 provide additional embodiments, including the nature of the non-porous solid support (claims 1954-1966); surface treatment (claims 1967-1977); fixation or immobilization (claims 1978-1982 and 2048); nature of the nucleic acids (claims 1983-1990); labels and signalling moieties (claims 1991-2037); detection (claims 2038-2041); and additional characteristics of the non-porous solid support, activated surface or system (claims 2042-2047).

Finally, claims 2049-2142 are also directed to a non-porous system. As set forth in claim 2049, which is independent, the system comprises a non-porous solid support comprising a surface which comprises one or more amine or polyamine or amino-derivitized or amino-substituted groups thereon, and at least one single-stranded nucleic acid strand or sequence fixed or immobilized to the solid support surface covalently or non-covalently through the amine or polyamine or amino-derivatized or amino-substituted group or groups. Dependent claims 2050-2142 are similar in many respects to the other dependent system claims discussed briefly in the previous paragraphs. Thus, claims 2050-2142 are directed to the nature of the non-porous solid support (claims 2050-2062); surface treatment (claims 2063-2073); fixation or immobilization (claims 2074-2075 and 2141-2142); nature of the nucleic acids (claims 2076-2083); labels and signalling moieties (claims 2084-2130); detection (claims 2131-2134); and additional characteristics of the non-porous solid support, activated surface or system (claims 2135-2140).

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In drafting new claims 1576-1242, Applicants continued to pay considerable attention to the new matter rejection in the October 10, 2001 Office Action. No new issue of new matter is believed to be raised by new claims 1576-1242.

Entry of the new claims is respectfully requested.

Further Elaboration on the New Matter Rejection (35 U.S.C. §112, First Paragraph)

In their April 10, 2002 Amendment Under 37 C.F.R. §1.116 (pages 56-58), Applicants responded to the new matter rejection of their claimed array practice as follows:

[1] At the outset, Applicants would respectfully point out that prior to the advent of their present invention, solid phase nucleic acid detection formats were severely disadvantaged by slow hybridization rates which were largely the consequence of poor matrix capacity. The present invention overcame the problem of capacity in solid phase detection formats by uniquely enhancing the fixation or immobilization of nucleic acid strands to the surfaces of substrates.

The Patent Office has taken the position that Applicants' claimed array practice is limited to the inclusion of wells or depressions. This is not the case. Applicants' disclosure in no way limits their array practice to wells or depressions. As stated in earlier responses, the passage on page 16, lines 9-27 referenced in the Office Action begins with the introductory phrase "For example, . . ." A person of ordinary skill in the art would have understood that the description on page 16 (lines 9-27) to be illustrative and not a limitation on Applicants' claimed invention.

In Applicants' May 30, 2001 Communication, charts were transmitted to show that their array practice was applicable to any substrate or surface, regardless of shape or topology. In the chart submitted as Exhibit 4 to their May 30, 2001 Communication, Applicants highlighted support within their specification for the claimed genus "Array of Substrate Surfaces." This information does indeed show that Applicants are entitled to the full scope of their array practice as now claimed.

Before closing, Applicants would like to point out further that their specification provides numerous instances where fixation or

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immobilization of nucleic acids to the surfaces of substrates is carried out, such instances clearly not being limited to wells or depressions. On page 15, reference is made under "DETAILED DESCRIPTION" of "methods for fixing the analyte to a non-porous solid support, . . ." Later on the same page under "EXAMPLE 1," further reference is made to "an analyte is immobilized on a solid support." Neither passage limits fixation or immobilization to wells or depressions.

Further in the specification on page 20 under EXAMPLE 5, Applicants describe a probe that is "immobilized on a non-porous plastic surface" and that "the adherence or fixing of DNA to a polystyrene surface is improved . . ." Moreover, Applicants disclose: Previous experiments demonstrated that addition of duodecadiamine (DDA) to polystyrene resulted in a uniform binding coefficient of polystyrene plates of different batches. Another technique for improving the fixing or uniformity of the plastic surface for fixing DNA involves the treatment of the surface with polylysine (PPL).

Polystyrene plates are also commonly referred to as "Petri dishes" and unquestionably possess flat surfaces which are not wells or depressions.

Again, on pages 21-22 (EXAMPLE 6) in the specification, Applicants disclose labelled, non-biotinylated denatured DNA [2000 ng to 5 ng] [being] "applied to the same DDA-coated polystyrene plates referenced on page 20 in the specification.

Lastly, on page 23, when Applicants describe "treatment of glass or polystyrene surfaces" at the top of the page, they are referring to surfaces -- but not surfaces with wells or depressions. In lines 4-5 on page 23, Applicants specifically describe:

These epoxy solutions are applied to the surfaces or wells, . . .

This last phrase clearly shows that surfaces or wells connotes different elements, but elements which can both be usefully employed in accordance with Applicants' present invention.

In further support of their position on their claimed array practice,

Applicants are pleased to submit the Declaration of Dr. Jannis G.

Stavrianopoulos, who is an inventor of this application and is also a senior scientist for the present assignee. A copy of Dr. Stavrianopoulos's Declaration is attached to this Supplemental Amendment as Exhibit A.

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Dr. Stavrianopoulos's Declaration speaks volumes on the issue of Applicants' claimed arrays. In order to streamline this filing, the statements of Dr. Stavrianopoulos are incorporated by reference into this Supplemental Amendment. Dr. Stavrianopoulos's statements in Sections 12-17, which are found on pages 13-38) are particularly relevant to Applicants' specification which discloses array embodiments for a variety of surfaces, and not just wells or depressions. Other statements of Dr. Stavrianopoulos are found in Sections 18-19 (pages 39-41) and are directed to the issue of "one" hybridization fluid or mixture contacting, flowing over, or simultaneously permitting overall array hybridization. Attached to Dr. Stavrianopoulos's Declaration are several exhibits, including his CV (Exhibit 1), the array claims submitted in this paper (Exhibit 2), and 24 scientific articles, books, dictionaries and the like (Exhibits 3-26).

Applicants and their undersigned attorney respectfully request consideration be given to Dr. Stavrianopoulos's statements and numerous exhibits, which are believed to be both helpful and dispositive on the issue of their claimed array practice.

Favorable action is respectfully requested.

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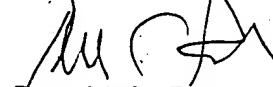
SUMMARY AND CONCLUSIONS

Former claims 1266-1575 have been canceled in favor of new claims 1576-2142 which are presented for further examination on the merits.

No claim fee for adding new claims 1576-1242, the number of new claims and independent claims being smaller than any previously paid for. As indicated in the accompanying Transmittal form, authorization is hereby given to charge any deficiencies to Deposit Account No. 05-1135. No fee or fees are believed due in connection with this filing. In the event that any other fee or fees are due, however, The Patent and Trademark Office is hereby authorized to charge the amount of any such fee or fees to Deposit Account No. 05-1135, or to credit any overpayment thereto.

If a telephone conversation would further the prosecution of the present application, Applicants' undersigned attorney request that he be contacted at the number provided below.

Respectfully submitted,


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